

FORM PTO-1390
(REV. 5-93)U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICEATTORNEY'S DOCKET NUMBER
2345/162**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/914403INTERNATIONAL APPLICATION NO.
PCT/EP00/01007INTERNATIONAL FILING DATE
26 January 2000
(26.01.00)PRIORITY DATE CLAIMED:
26 February 1999
(26.02.99)TITLE OF INVENTION
TELECOMMUNICATIONS NETWORK STATION FOR TRANSMITTING DIGITALISED DATAAPPLICANT(S) FOR DO/EO/US
Jochen ANTKOWIAK; Bernd BOELIKE; and Diethard HAENSSGEN

Applicant(s) herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) immediately rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)) . (signed)
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☒ A substitute specification and a marked up version of the substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: International Search Report, International Preliminary Examination Report and Form PCT/RO/101.

Express Mail No.: EL244504974US

U.S. APPLICATION NO. (if known) 37 C.F.R. 1.5

09/914403

INTERNATIONAL APPLICATION NO.
PCT/EP00/01007ATTORNEY'S DOCKET NUMBER
2345/16217. ☒ The following fees are submitted:**Basic National Fee (37 CFR 1.492(a)(1)-(5)):**

Search Report has been prepared by the EPO or JPO \$860.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) \$690.00

No international preliminary examination fee paid to USPTO (37 CFR 1.482) but
international search fee paid to USPTO (37 CFR 1.445(a)(2)) \$710.00Neither international preliminary examination fee (37 CFR 1.482) nor international
search fee (37 CFR 1.445(a)(2)) paid to USPTO \$1,000.00International preliminary examination fee paid to USPTO (37 CFR 1.482) and all
claims satisfied provisions of PCT Article 33(2)-(4) \$100.00

CALCULATIONS | PTO USE ONLY

ENTER APPROPRIATE BASIC FEE AMOUNT =

\$ 860

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months
from the earliest claimed priority date (37 CFR 1.492(e)).

\$

Claims	Number Filed	Number Extra	Rate		
Total Claims	8 - 20 =	0	X \$18.00	\$0	
Independent Claims	2 - 3 =	0	X \$80.00	\$0	
Multiple dependent claim(s) (if applicable)			+ \$270.00	\$	

TOTAL OF ABOVE CALCULATIONS =

\$860

Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must
also be filed. (Note 37 CFR 1.9, 1.27, 1.28).

\$

SUBTOTAL =

\$860

Processing fee of \$130.00 for furnishing the English translation later the ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(f)).

+

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TOTAL NATIONAL FEE =

\$860

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property

+

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TOTAL FEES ENCLOSED =

\$860

Amount to be
refunded
charged

\$

\$

a. ☐ A check in the amount of \$_____ to cover the above fees is enclosed.b. ☒ Please charge my Deposit Account No. 11-0600 in the amount of \$860.00 to cover the above fees. A duplicate copy of this
sheet is enclosed.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to
Deposit Account No. 11-0600. A duplicate copy of this sheet is enclosed.**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or
(b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

Richard L. Mayer, Reg. No. 22,490
NAME

DATE

8/27/2001

CUSTOMER NO. 26646

[2345/162]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s) : Jochen ANTKOWIAK et al.
Serial No. : To Be Assigned
Filed : Herewith
For : TELECOMMUNICATIONS NETWORK STATION
FOR TRANSMITTING DIGITALISED DATA
Art Unit : To Be Assigned
Examiner : To Be Assigned

Assistant Commissioner
for Patents
Washington, D.C. 20231

**PRELIMINARY AMENDMENT AND
37 C.F.R. § 1.125 SUBSTITUTE SPECIFICATION STATEMENT**

SIR:

Please amend without prejudice the above-identified application before
examination, as set forth below.

IN THE DRAWINGS:

Please enter Figures 1 and 2 of the Revised Pages of the annexes to replace
original Figures 1 and 2.

IN THE TITLE:

Please replace the title with the following:
--METHOD AND DEVICE FOR THE TRANSMISSION OF DIGITIZED DATA --.

IN THE SPECIFICATION AND ABSTRACT:

In accordance with 37 C.F.R. § 1.121(b)(3), a Substitute Specification
(including the Abstract, but without claims) accompanies this response. It is respectfully

requested that the Substitute Specification (including Abstract) be entered to replace the Specification of record.

The Substitute Specification reflects the annex's revised pages 1 to 7 that replaced the original specification during the international preliminary examination.

IN THE CLAIMS:

Without prejudice, please cancel original claims 1 to 8 in the original application and please also cancel revised claims 1 to 8 from the annex of the International Preliminary Examination Report, and please add new claims 9 to 16 as follows:

--9. (New) A method for transmitting digitized, broadband data, which are suppliable by various sources for retransmission and which are selectable by a user via a reverse channel, comprising:

performing signal analysis on source signals, and, if necessary, converting a data format of the source signals;

centrally comparing the source signals to a quality measure before performing the signal analysis and before the retransmission, wherein the quality measure is demanded by a selecting user; and

performing a signal improvement on inferior quality signals with respect to the data format and errors of the source signals, wherein the signal improvement includes at least one of a standard conversion through an up-conversion and a special signal improvement.

10. (New) The method of claim 9, further comprising:

demultiplexing multiplexed data streams to demultiplexed signals, if necessary, before performing the signal analysis;

subsequently analyzing signals to be processed with respect to their data formats and errors; and

performing a format conversion if an input signal format and an output signal format differs;

performing additional special signal improvements to signals whose quality is improvable; and

multiplexing the demultiplexed signals.

11. (New) The method of claim 9, wherein the method is used to process at least one of video signals, digital signals, measurement signals, and sound signals, in a same manner as source signals.

12. (New) The method of claim 9, wherein the signal analysis is switchable by a subscriber via the reverse channel.

13. (New) The method of claim 9, wherein decisions on the signal analysis are from a table.

14. (New) The method of claim 9, further comprising:

converting the signal format for a return path for a bidirectional signal transmission.

15. (New) A system for transmitting digitized, broadband data, which are suppliable by various sources for retransmission and which are selectable by a user via a reverse channel, comprising:

a central communications network station;

a demultiplexer arrangement;

a signal-analysis arrangement following the demultiplexer arrangement;

at least one signal processing arrangement, following the signal-analysis arrangement, to improve source signals prior to a subsequent multiplexing;

wherein the system is operable to:

perform signal analysis on the source signals, and, if necessary, convert a data format of the source signals;

centrally compare the source signals to a quality measure before performing the signal analysis and before the retransmission, wherein the quality measure is demanded by a selecting user; and

perform a signal improvement on inferior quality signals with respect to the data format and errors of the source signals, wherein the signal improvement includes at least one of a standard conversion through an up-conversion and a special signal improvement.

16. (New) The device of claim 15, further comprising a control device coupled to the demultiplexer arrangement.--

REMARKS

This Preliminary Amendment cancels without prejudice original claims 1 to 8 in the underlying PCT Application No. PCT/EP00/01007, and revised/substitute claims 1 to 8 in the annex of the International Preliminary Examination Report, and adds without prejudice new claims 9 to 16. The new claims conform the claims to U.S. Patent and Trademark Office rules and do not add new matter to the application.

In the Drawings, please enter Figures 1 and 2 of the Revised Pages of the annexes to replace original Figures 1 and 2.

In accordance with 37 C.F.R. § 1.121(b)(3), the Substitute Specification (including the Abstract, but without the claims) contains no new matter. The amendments reflected in the Substitute Specification (including Abstract) are to conform the Specification and Abstract to U.S. Patent and Trademark Office rules or to correct informalities. As required by 37 C.F.R. § 1.121(b)(3)(iii) and § 1.125(b)(2), a Marked Up Version Of The Substitute Specification comparing the Specification of record and the Substitute Specification also accompanies this Preliminary Amendment. In the Marked Up Version, shading indicates added text and bracketing indicates deleted text. Approval and entry of the Substitute Specification (including Abstract) is respectfully requested.

The underlying PCT Application No. PCT/EP00/01007 includes an International Search Report, dated May 18, 2000. The Search Report includes a list of documents that were uncovered in the underlying PCT Application. A copy of the Search Report accompanies this Preliminary Amendment.

The underlying PCT Application No. PCT/EP00/01007 also includes an International Preliminary Examination Report, dated May 17, 2001, and related annex (including revised pages 1 to 7 of the specification, and revised/substitute claims 1 to 8). An English translation of the International Preliminary Examination Report and annex accompanies this Preliminary Amendment.

Applicants assert that the subject matter of the present application is new, non-obvious, and useful. Prompt consideration and allowance of the application are respectfully requested.

Respectfully Submitted,
KENYON & KENYON

Dated: 8/27/2001

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DEP 15217)

10/22/01 10:44:03

[2345/162]

[TELECOMMUNICATIONS/COMMUNICATIONS NETWORK STATION
METHOD AND DEVICE FOR TRANSMITTING] THE TRANSMISSION OF
DIGITIZED DATA

FIELD OF THE INVENTION

The present invention [is directed to a] relates to a method
and device for the transmission of digitized data.

BACKGROUND INFORMATION

Reference European Patent Application No. 0 660 580 discusses
an "image information format control device" that provides for
a transmission of digital broadband signals from different
sources, which are selected by users via a reverse channel.
The source signals, CIF or QCIF, first undergo an available
signal analysis. If necessary, the data format may be
subsequently converted.

The method and device discussed in the reference is believed
to require a storage capacity for the largest data format, for
a universal application, as required for use in
telecommunications/communications network station[of the type
described in greater detail in the first part of Claim 1.]s.
Due to the storage capacity, the method and device may not
permit the conversion of live signals, nor any up-conversion
(neither with respect to data nor format), nor any improvement
of images through elimination of image errors.

Telecommunications/communications [network]stations are
[known]discussed, for example, [from]in the
[publications:]references DAVIC 1.0, Specification Part 04,
Delivery System Architecture and Interfaces[Digital
Audio-Visual Council 1995 - 1999 and : DAVIC 1.3.1
Specification Part 4, Delivery System Architecture and
Interfaces Digital Audio-Visual Council 1998, both published

MARKED UP VERSION OF THE SUBSTITUTE SPECIFICATION

by], Digital Audio-Visual Council, Geneva, Switzerland, 1995-1999; and DAVIC 1.3.1, Specification Part 04, Delivery System Architecture and Interfaces, Digital Audio-Visual Council, Geneva, Switzerland, 1998.

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Reference PCT Patent Application No. WO96/06399 discusses a method for "the simultaneous digital processing of a plurality of data packets to be transmitted from/to audio-video devices in a computer system". The reference discusses solving the interface problems that arise by a software-supported data switching system, in contrast to the hardware-supported data switching systems which may be otherwise used.

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In telecommunications networks, it is believed that errors normally compensated for by the error protection scheme, may also occur when digitized signals are used. An inadequate error protection scheme [can]may result in degradation or complete failure of the signal or signals[]. Coding errors, which are often block errors, [can]may occur already at the time of the coding. [For these reasons,]It is believed that some attempts are underway to monitor signals at various stations within the network in order to guarantee the quality of service = QoS.

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[The aim is to have no further]Minimization of degradation within [the]a network[, to the extent] is desired. It is believed that[is possible. Often,] access to [the]a user [is]can often be the most critical point. [Therefore, many] Some efforts are [currently]believed to be directed to providing this access with a wider bandwidth capability. [Known]Some available feasible ways to increase bandwidth include, for example, ADSL (asymmetric digital subscriber line), VDSL (very high bit rate digital subscriber line) [or, in general, xDSL]and xDSL (generic digital subscriber line).

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[T]It is believed that the effect of increasing bandwidth

[is]may not further appreciabl[e degradation of]y degrade the signal[,] or [the]an ability to transmit a high-quality signal[in the first place]. A high-quality transmission [is possible]may occur from the outset by using broadband transmission methods, [such as]for example, MMDS (microwave multipoint distribution systems). The new and improved picture-reproduction devices may intensify user demand for high-quality video transmission.

[T]Some telecommunications carriers are [faced]concerned with[the task of] guaranteeing the best possible or at least better signal transmission. [However, they are]The carriers may be confronted with the technical problem of input signals not meeting the users' quality expectations, because of [the]reception, standards, coding, and/or narrow-band feeder links, [or]and for[many of] these and/or other reasons. [Generally, however]For example, the user may proces[se]s the signals in the manner that [he]the user receives them.

[The object]SUMMARY OF THE INVENTION

An exemplary embodiment and/or exemplary method of the present invention is directed to [outfit]providing that a telecommunications/communications station is equipped for transmitting digitized data such that the user is[also] provided with a signal quality that is enhanced beyond the quality of the input signal.

[This objective is achieved by]Another exemplary embodiment and/or exemplary method of the present invention [by the features described in the characterizing part of Claim 1.

Advantageous embodiments and further refinements are described in the characterizing part of dependent claims 2 through 8.

The contradiction that the telecommunications carriers are faced with, on the one hand, of not being able to influence

low-quality] is directed to influencing low-quality input signals[,] and[of wanting to deliver the] delivering highest quality signals to [the] a user[, is resolved] by introducing an additional function to [the] a network [which makes it possible to enhance] providing an enhancement of the signal quality and thereby surpass the input-side signal quality.

[]

A user wishing to undertake the operation of such a multifaceted and complex signal processing [himself, would] may entail substantial costs. The signal processing [would] may also only be utilized by [him] the user in a time-restricted fashion.

Partial solutions appear to exist for improving signals in individual application cases where the input signal format and the output signal are known. These partial solutions make do without signal analysis, since both the input format, as well as the desired output format are known. The existence of such partial solutions [shall] may be utilized, on the one hand, to demonstrate how the subscribers' wish for signal improvement is justified and, on the other hand, how the task can be resolved for partial problems. [

For quite some time already, t] The receiver industry has [been offering] some 100 Hz technology already available.

Up-converters for standard conversions exist for specific formats.

[However, all known] Any available methods [have the shortcoming of] may only [allowing] allow partial solutions and [of] may not [being] be suitable for application within the network. Signal analysis methods, [as well as possibilities for improving] including effects of improved individual or[a] multiplicity of signal parameters, are[, in fact, known. These additional, new] believed to be available. The complexity of such "new" network functions [are not known, however, in their complexity.

The present invention is elucidated in the following on the basis of exemplary embodiments. In the corresponding drawing, the figures show:

5 Figure 1a] is not believed to be known.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a basic signal pattern from the source to the [picture reproduction, the source and the subsequent
10 transmission link being [narrow band; and] narrowband.

Figure 2[] shows modules for [the] providing signal processing.

DETAILED DESCRIPTION

In accordance with Figure 1, to enhance the signal quality in the network, a new function, i.e., signal improvement, is implemented as a network function.

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20 The mode of operation of the modules in Figure 2 is described [in greater detail in the following:
] as follows. A control device R can be used for switching the signal processing on and off to improve the signals from the subscriber[s].

25 A signal analysis "A" is introduced before the actual signal improvement. In the simplest case entailing exclusively known parameters, the decisions on signal analysis can also be drawn from a table. A component of this signal analysis "A" is
30 determining the input format. The desired initial basic[] format is requested in [the] control device R. The standard conversion to signal improvement is established from these input quantities.

35 In the signal analysis "A", automatic error determinations [are] may also be made for the powered-up time. Often block

errors arise when encoding is carried out at data rates which are too low. Errors of this kind can be minimized [through application of] by appropriate (error [handling] processing) special signal improvements SS. When working with block errors, a decision is made with the assistance of an algorithm, for example, as to whether the faulty block is to be [] replaced by a block from an adjacent area, an earlier image, or by performing a recalculation.

Figure 2 shows several examples of signal analysis "A" and signal improvement F, S, and SS units. The first unit [can] may be used for the video signal of (subscriber) user 1. The second unit [can] may be used, for example, by another (subscriber) user. In the same way, [improving] improvement of the sound signal [is] may also [possible, in theory] be done. [However, t] This [would] may entail less of an expenditure, many times over, and, therefore, [is] may not necessarily [to] be implemented as a network function. It [can likewise] may be beneficial, however, to improve other digital signals, such as measuring signals.

If the corresponding formats are known in the control device R, then a table [can] may also be used.

The utilization of the exemplary embodiments and/or exemplary methods of the present invention signifies an increase in value for the routed signals. It [is] may be especially necessary for new multi-media services, where narrow[-]band sources or accesses are often involved as well. In developing the circuits for interactive services, a least possible or minimum delay [must] should be [an important] a consideration for signal improvement. In addition, a down-conversion can also be used analogously for interactive services.

Also, the use is not necessarily restricted to specific types of transmission links[. It can be used, in particular] or

routes. The exemplary embodiments and/or exemplary methods of the present invention may be used, for example, for all broadband accesses (cable connections, ADSL, xDSL, or HF connections to subscribers).

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The [method is also] exemplary methods and/or exemplary devices of the present invention are also believed to be suited for MPEG signals (video, sound, and data signals, which are coded according to the specifications of the Moving Pictures Experts Group), and for ATM signals (asynchronous transfer mode).

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FOI280" E044T660

ABSTRACT OF THE DISCLOSURE

[2. Abstract

2.1. Known]A method and device for setting up
5 telecommunications/communications networks [for
transmitting]that transmit digital data[are set up], to
avoid, to the greatest possible extent, any degradation of the
signals, and to eliminate or at least reduce errors, so that a
certain quality is [always guaranteed.

10 2.2. By applying and utilizing the present invention, one can
also raise]at least better guaranteed, and to enhance the QoS
for those signals for which this quality is not given on the
input side, or [not given due to a transmission over a very
15 long distance. [With the]The method and device may be used
within any planned expansion of the accesses (e.g., ADSL or
MMDS), as may be required by the new multi-media services[,
the invention gains in significance. The result is that the
proposed technology is effectively utilized]. The method and
20 device may be effectively used as a network function, [and
that]while better ensuring an acceptable price [is achieved
]for the subscriber. [

25 2.3. A preferred application of the present invention is
provided for video signals, however]. A method and device are
also provided for raising video signals, sound signals and
other digital signals [can also be raised]to a higher signal
quality[][[level]].

30 [3. Figure 2]

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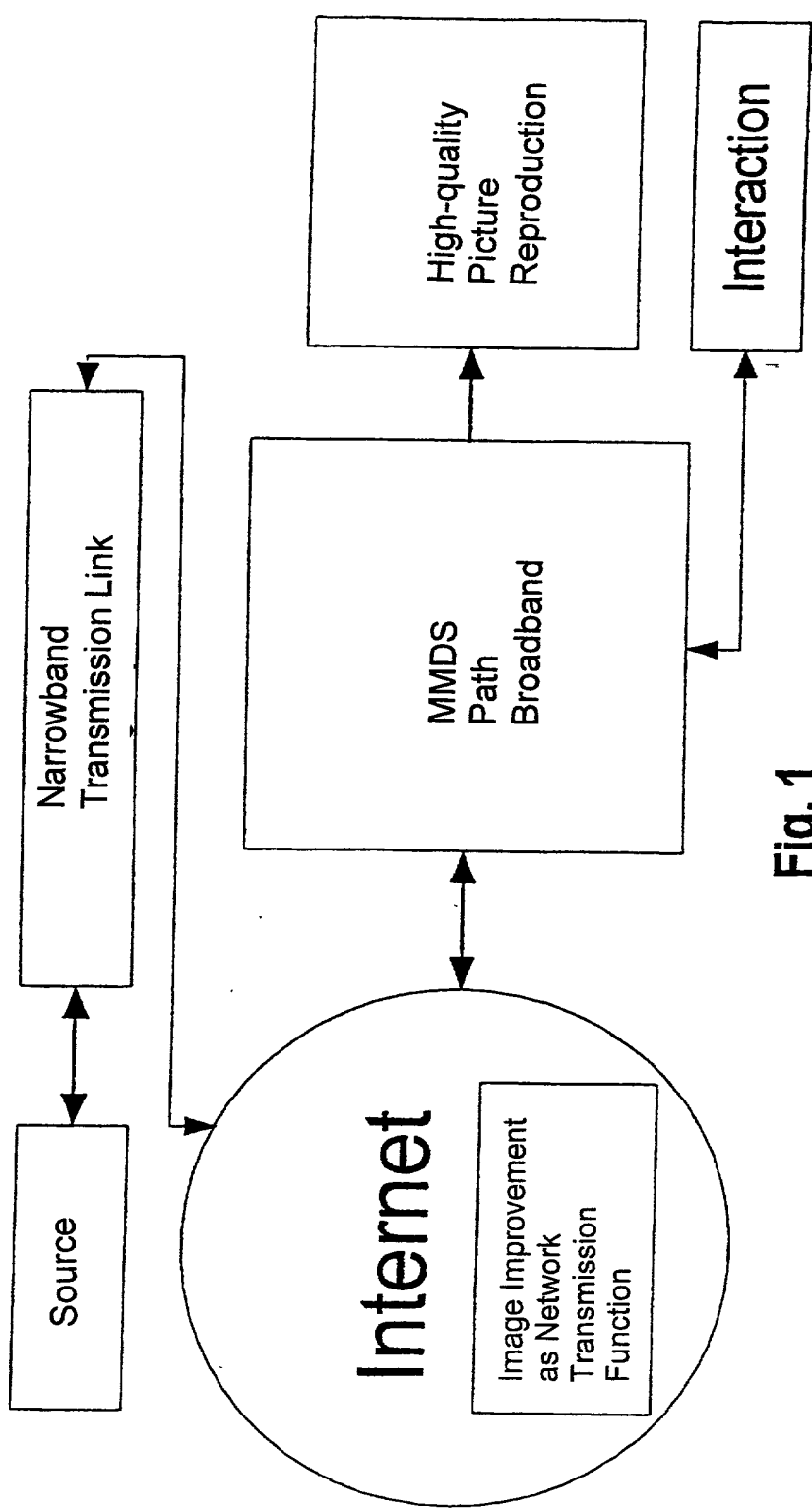


Fig. 1

FIG. 1

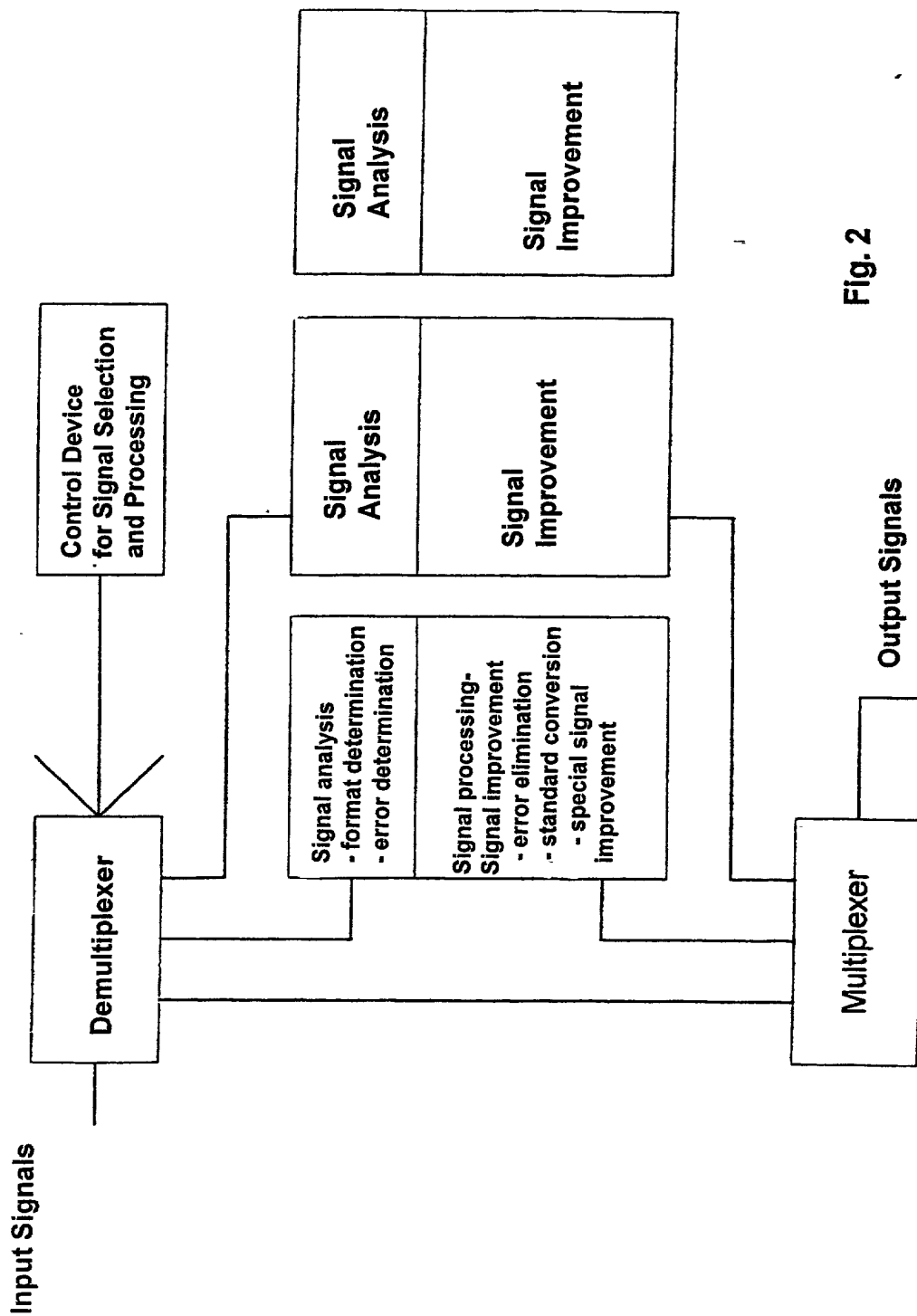


Fig. 2

[2345/162]

METHOD AND DEVICE FOR THE TRANSMISSION OF DIGITIZED DATA

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The present invention is directed to a method of the type described in greater detail in the first part of Claim 1, and to a device as described more closely in the first part of Claim 7. Methods and devices of this kind are known, for example, from EP A-0 660 580. The "image information format control device" described therein is provided for a transmission of digital broadband signals from different sources, which are selected by users via a backward channel. The source signals, CIF or QCIF, first undergo a known signal analysis. If necessary, the data format is subsequently converted.

However, there are significant drawbacks to this approach, which requires a storage capacity for the largest data format, for a universal application, as required for a use in telecommunications/communications network stations. Due to the storage capacity, it does not permit the conversion of live signals, nor any up-conversion (neither with respect to data nor format), nor any improvement of images through elimination of image errors.

Telecommunications/communications stations are known, for example, from the publications: DAVIC 1.0 Specification Part 04, Delivery System Architecture and Interfaces Digital Audio-Visual Council 1995 - 1999 and : DAVIC 1.3.1 Specification Part 4, Delivery System Architecture and Interfaces Digital Audio- Visual Council 1998, both published by Digital Audio-Visual Council, Geneva, Switzerland.

From WO-A-96/06399, a method is also known for "the simultaneous digital processing of a plurality of data packets to be transmitted from/to audio-video devices in a computer system". It describes solving the interface problems that

arise by a software-supported data switching system, in contrast to the hardware-supported data switching which are otherwise used.

5 In telecommunications networks, errors normally compensated for by the error protection, also occur when digitized signals are used. An inadequate error protection can result in degradation or complete failure of the signal or signals. Coding errors, which are often block errors, can occur already at the time of the coding. For these reasons, attempts are underway to monitor signals at various stations within the network in order to guarantee the quality of service = QoS.

10 The aim is to have no further degradation within the network, to the extent that is possible. Often, access to the user is the most critical point. Therefore, many efforts are currently directed to providing this access with a wider bandwidth capability. Known feasible ways to increase bandwidth include, for example, ADSL (asymmetric digital subscriber line), VDSL (very high bit rate digital subscriber line) or, in general, xDSL.

15 The effect of increasing bandwidth is no further appreciable degradation of the signal, or the ability to transmit a high-quality signal in the first place. A high-quality transmission is possible from the outset by using broadband transmission methods, such as MMDS (microwave multipoint distribution systems). The new and improved picture-reproduction devices intensify user demand for high-quality video transmission.

20 The telecommunications carriers are faced with the task of guaranteeing the best possible signal transmission. However, they are confronted with the technical problem of input signals not meeting the users' quality expectations, because of the reception, standards, coding, narrow-band feeder links, or for many of these reasons. Generally, however, the user

processes the signals in the manner that he receives them.

In accordance with the object of the present invention,
through application of a new method, a

5 telecommunications/communications station is to be outfitted
for transmitting digitized data such that the user is also
provided with a signal quality that is enhanced beyond the
quality of the input signal.

10 This objective is achieved by the present invention by the
features described in the characterizing part of Claim 1.
Advantageous embodiments and further refinements are described
in the characterizing part of dependent Claims 2 through 6. A
device for implementing this method is described in Claim 7,
and a further refinement thereof in Claim 8.

20 The contradiction that the telecommunications carriers are
faced with, on the one hand, of not being able to influence
low-quality input signals, and of wanting to deliver the
highest quality signals to the user, is resolved by
introducing an additional function to the network which makes
it possible to enhance the signal quality and thereby surpass
the input-side signal quality.

25 A user wishing to undertake the operation of such a
multifaceted and complex signal processing himself, would
entail substantial costs. The signal processing would also
only be utilized by him in a time-restricted fashion.

30 Partial solutions exist for improving signals in individual
application cases where the input signal format and the output
signal are known. These make do without signal analysis, since
both the input format, as well as the desired output format
are known. The existence of such partial solutions shall be
35 utilized, on the one hand, to demonstrate how the subscribers'
wish for signal improvement is justified and, on the other
hand, how the task can be resolved for partial problems. For

quite some time already, the receiver industry has been offering 100 Hz technology. Up-converters for standard conversions exist for specific formats.

5 However, all known methods have the shortcoming of only allowing partial solutions and of not being suitable for application within the network. Signal analysis methods, as well as possibilities for improving individual or a multiplicity of signal parameters are, in fact, known. These
10 additional, new network functions are not known, however, in their complexity.

The present invention is elucidated in the following on the basis of exemplary embodiments. In the corresponding drawing, the figures show:

Figure 1 a basic signal pattern from the source to the picture reproduction, the source and the subsequent transmission link being narrowband;
20 and

Figure 2 modules for the signal processing.

In accordance with Figure 1, to enhance the signal quality in
25 the network, a new function, i.e., signal improvement, is implemented as a network function.

The mode of operation of the modules in Figure 2 is described in greater detail in the following:

30 A control device R can be used for switching the signal processing on and off to improve the signals from the subscriber.

A signal analysis A is introduced before the actual signal
35 improvement. In the simplest case entailing exclusively known parameters, the decisions on signal analysis can also be drawn from a table. A component of this signal analysis A is

determining the input format. The desired initial basic format is requested in control device R. The standard conversion to signal improvement is established from these input quantities.

5 In the signal analysis A, automatic error determinations are also made for the powered-up time. Often block errors arise when encoding is carried out at data rates which are too low. Errors of this kind can be minimized by appropriate (error processing) special signal improvements SS. When working with
10 block errors, a decision is made with the assistance of an algorithm, for example, as to whether the faulty block is replaced by a block from an adjacent area, an earlier image, or by performing a recalculation.

15 Figure 2 shows several signal analysis A and signal improvement F; S; and SS units. The first unit can be used for the video signal of (subscriber) user 1. The second unit can be used, for example, by another (subscriber) user. In the same way, improving the sound signal is also possible, in
20 theory. However, this would entail less of an expenditure, many times over, and, therefore, is not necessarily to be implemented as a network function. It can likewise be beneficial, however, to improve other digital signals, such as measuring signals.

25 If the corresponding formats are known in the control device R, then a table can also be used.

30 The utilization of the present invention signifies an increase in value for the routed signals. It is especially necessary for new multi-media services, where narrowband sources or accesses are often involved as well. In developing the circuits for interactive services, a least possible delay must be an important consideration for signal improvement. In
35 addition, a down-conversion can also be used analogously for interactive services.

Also, the use is not restricted to specific types of transmission links. It can be used, in particular, for all broadband accesses (cable connections, ADSL, xDSL, or HF connections to subscribers).

5

The method is also suited for MPEG signals (video, sound, and data signals, which are coded according to the specifications of the Moving Pictures Experts Group), and for ATM signals (asynchronous transfer mode).

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TO: "CORRECTED"

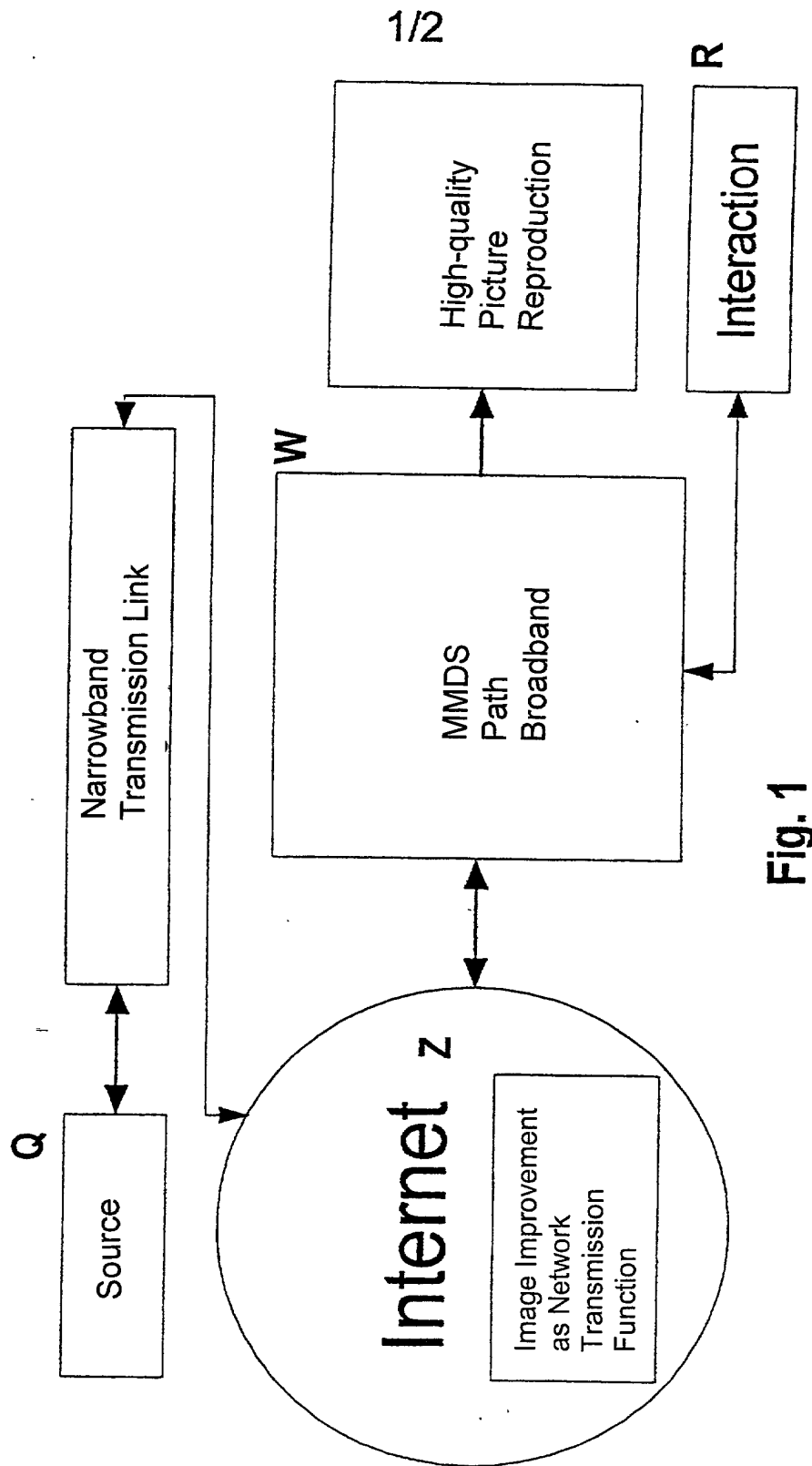
What is claimed is:

1. A method for the transmission of digitized, broadband data, which are supplied by various sources Q for retransmission and which are selected by users via a backward channel R, the source signals Q first undergoing a generally known signal analysis, and, subsequently, if necessary, the data format being converted, wherein the source signals (Q), subsequent to the generally known signal analysis and prior to the retransmission (W) are centrally (Z) compared to the quality demanded by the selecting user, and, subsequently thereto, the signals of inferior quality undergo a signal improvement with respect to format (along the lines of a standard conversion S through up-conversion and/or special signal improvement SS) and errors (error elimination F).
2. The method as recited in Claim 1, wherein:
 - when working with multiplexed data streams, a demultiplexing (D) is carried out prior to the signal analysis;
 - the signals to be processed are subsequently analyzed with respect to their formats and their errors (A); and
 - given different input and output signal formats, format conversions are carried out; and,
 - given signals, whose quality is able to be improved, additional special signal improvements (SS) are made; and,
 - when working with signals demultiplexed at the outset, a multiplexing (M) is carried out again.
3. The method as recited in Claim 1, wherein, besides () video signals, () other digital signals, such as measurement and sound signals, are also processed in the same way as source signals.
4. The method as recited in Claim 1, wherein the signal processing is designed so as to be

switchable by the subscriber via the backward channel (R).

5. The method as recited in Claim 1, wherein the decisions on signal analysis are taken from a table.
6. The method as recited in Claim 1, wherein, in the case of bidirectional signal transmissions, a conversion of the signal format is also carried out for the return path.
7. A device for implementing the method as recited in Claims 1 through 6,
wherein, in a central telecommunications/communications network station (Z), provision is made for at least one signal-analysis device (A) to follow a demultiplexer (D), and, subsequent thereto, for at least one signal processing device (F; S; SS) for improving signals prior to a subsequent multiplexing (M).
8. The device as recited in Claim 7, wherein a control device is linked to the demultiplexer/multiplexer device.

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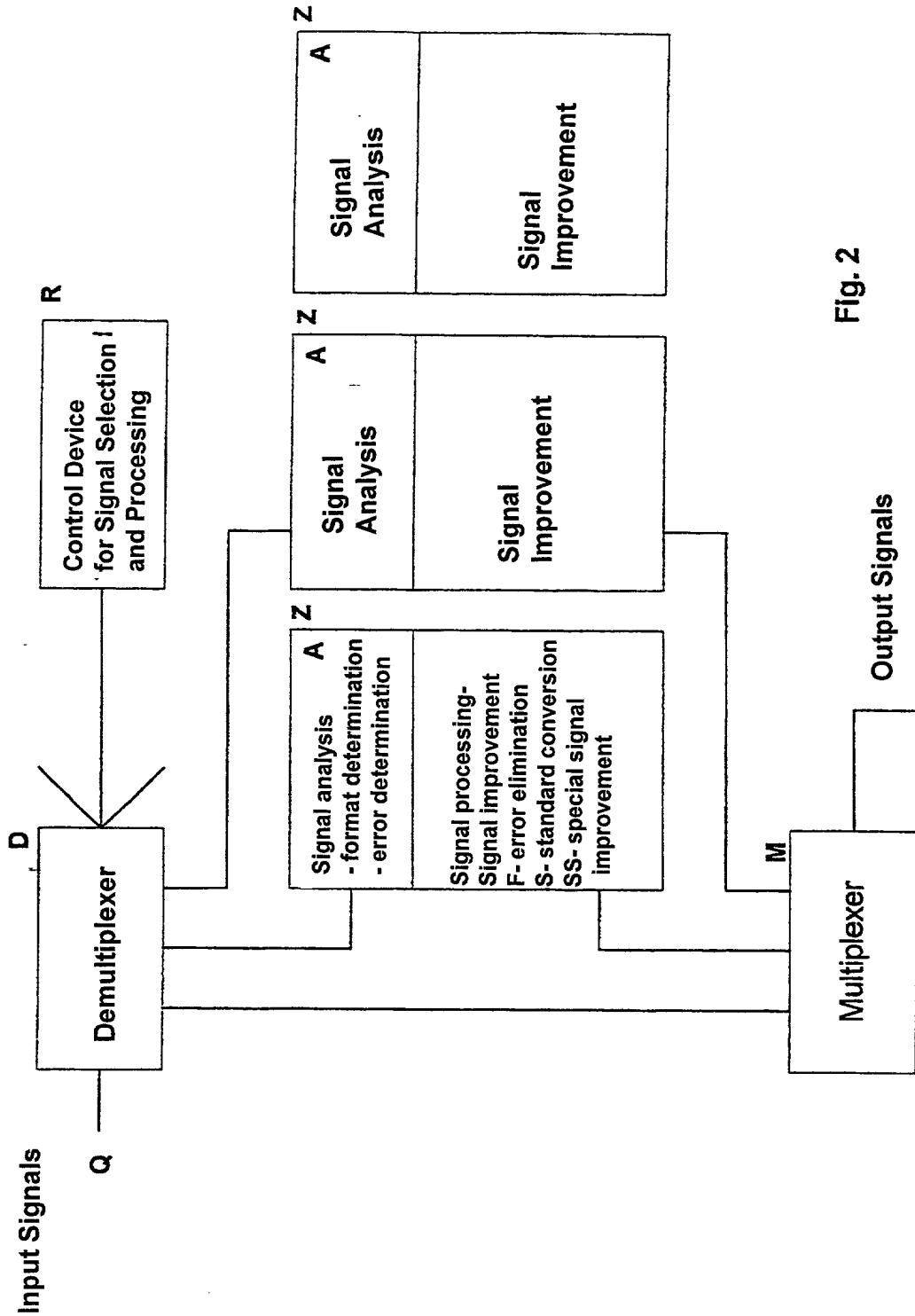


Fig. 2

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[2345/162]

METHOD AND DEVICE FOR THE TRANSMISSION OF DIGITIZED DATA

FIELD OF THE INVENTION

The present invention relates to a method and device for the transmission of digitized data.

5 BACKGROUND INFORMATION

Reference European Patent Application No. 0 660 580 discusses an "image information format control device" that provides for a transmission of digital broadband signals from different sources, which are selected by users via a reverse channel. The source signals, CIF or QCIF, first undergo an available signal analysis. If necessary, the data format may be subsequently converted.

The method and device discussed in the reference is believed to require a storage capacity for the largest data format, for a universal application, as required for use in telecommunications/communications network stations. Due to the storage capacity, the method and device may not permit the conversion of live signals, nor any up-conversion (neither with respect to data nor format), nor any improvement of images through elimination of image errors.

Telecommunications/communications stations are discussed, for example, in the references DAVIC 1.0, Specification Part 04, Delivery System Architecture and Interfaces, Digital Audio-Visual Council, Geneva, Switzerland, 1995-1999; and DAVIC 1.3.1, Specification Part 04, Delivery System Architecture and Interfaces, Digital Audio-Visual Council, Geneva, Switzerland, 1998.

Reference PCT Patent Application No. WO96/06399 discusses a

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method for "the simultaneous digital processing of a plurality of data packets to be transmitted from/to audio-video devices in a computer system". The reference discusses solving the interface problems that arise by a software-supported data switching system, in contrast to the hardware-supported data switching systems which may be otherwise used.

In telecommunications networks, it is believed that errors normally compensated for by the error protection scheme, may also occur when digitized signals are used. An inadequate error protection scheme may result in degradation or complete failure of the signal or signals. Coding errors, which are often block errors, may occur already at the time of the coding. It is believed that some attempts are underway to monitor signals at various stations within the network in order to guarantee the quality of service = QoS.

Minimization of degradation within a network is desired. It is believed that access to a user can often be the most critical point. Some efforts are believed to be directed to providing this access with a wider bandwidth capability. Some available feasible ways to increase bandwidth include, for example, ADSL (asymmetric digital subscriber line), VDSL (very high bit rate digital subscriber line) and xDSL (generic digital subscriber line).

It is believed that the effect of increasing bandwidth may not further appreciably degrade the signal or an ability to transmit a high-quality signal. A high-quality transmission may occur from the outset by using broadband transmission methods, for example, MMDS (microwave multipoint distribution systems). The new and improved picture-reproduction devices may intensify user demand for high-quality video transmission.

Some telecommunications carriers are concerned with guaranteeing the best possible or at least better signal

transmission. The carriers may be confronted with the technical problem of input signals not meeting the users' quality expectations, because of reception, standards, coding, and/or narrow-band feeder links, and for these and/or other reasons. For example, the user may process the signals in the manner that the user receives them.

SUMMARY OF THE INVENTION

An exemplary embodiment and/or exemplary method of the present invention is directed to providing that a telecommunications/communications station is equipped for transmitting digitized data such that the user is provided with a signal quality that is enhanced beyond the quality of the input signal.

Another exemplary embodiment and/or exemplary method of the present invention is directed to influencing low-quality input signals and delivering highest quality signals to a user by introducing an additional function to a network providing an enhancement of the signal quality and thereby surpass the input-side signal quality.

A user wishing to undertake the operation of such a multifaceted and complex signal processing may entail substantial costs. The signal processing may also only be utilized by the user in a time-restricted fashion.

Partial solutions appear to exist for improving signals in individual application cases where the input signal format and the output signal are known. These partial solutions make do without signal analysis, since both the input format, as well as the desired output format are known. The existence of such partial solutions may be utilized, on the one hand, to demonstrate how the subscribers' wish for signal improvement is justified and, on the other hand, how the task can be resolved for partial problems. The receiver industry has some

100 Hz technology already available. Up-converters for standard conversions exist for specific formats.

Any available methods may only allow partial solutions and may not be suitable for application within the network. Signal analysis methods, including effects of improved individual or multiplicity of signal parameters, are believed to be available. The complexity of such "new" network functions is not believed to be known.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a basic signal pattern from the source to the picture reproduction, the source and the subsequent transmission link being narrowband.

Figure 2 shows modules for providing signal processing.

DETAILED DESCRIPTION

In accordance with Figure 1, to enhance the signal quality in the network, a new function, i.e., signal improvement, is implemented as a network function.

The mode of operation of the modules in Figure 2 is described as follows. A control device R can be used for switching the signal processing on and off to improve the signals from the subscriber.

A signal analysis "A" is introduced before the actual signal improvement. In the simplest case entailing exclusively known parameters, the decisions on signal analysis can also be drawn from a table. A component of this signal analysis "A" is determining the input format. The desired initial basic format is requested in control device R. The standard conversion to signal improvement is established from these input quantities.

In the signal analysis "A", automatic error determinations may

also be made for the powered-up time. Often block errors arise when encoding is carried out at data rates which are too low. Errors of this kind can be minimized by appropriate (error processing) special signal improvements SS. When working with block errors, a decision is made with the assistance of an algorithm, for example, as to whether the faulty block is to be replaced by a block from an adjacent area, an earlier image, or by performing a recalculation.

Figure 2 shows several examples of signal analysis "A" and signal improvement F; S; and SS units. The first unit may be used for the video signal of (subscriber) user 1. The second unit may be used, for example, by another (subscriber) user. In the same way, improvement of the sound signal may also be done. This may entail less of an expenditure, many times over, and, therefore, may not necessarily be implemented as a network function. It may be beneficial, however, to improve other digital signals, such as measuring signals.

If the corresponding formats are known in the control device R, then a table may also be used.

The utilization of the exemplary embodiments and/or exemplary methods of the present invention signifies an increase in value for the routed signals. It may be especially necessary for new multi-media services, where narrowband sources or accesses are often involved as well. In developing the circuits for interactive services, a least possible or minimum delay should be a consideration for signal improvement. In addition, a down-conversion can also be used analogously for interactive services.

Also, the use is not necessarily restricted to specific types of transmission links or routes. The exemplary embodiments and/or exemplary methods of the present invention may be used, for example, for all broadband accesses (cable connections,

ADSL, xDSL, or HF connections to subscribers).

The exemplary methods and/or exemplary devices of the present invention are also believed to be suited for MPEG signals (video, sound, and data signals, which are coded according to the specifications of the Moving Pictures Experts Group), and for ATM signals (asynchronous transfer mode).

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ABSTRACT OF THE DISCLOSURE

A method and device for setting up telecommunications/communications networks that transmit digital data, to avoid, to the greatest possible extent, any degradation of the signals, and to eliminate or at least reduce errors, so that a certain quality is at least better guaranteed, and to enhance the QoS for those signals for which this quality is not given on the input side, or not given due to a transmission over a very long distance. The method and device may be used within any planned expansion of the accesses (e.g., ADSL or MMDS), as may be required by the new multi-media services. The method and device may be effectively used as a network function, while better ensuring an acceptable price for the subscriber. A method and device are also provided for raising video signals, sound signals and other digital signals to a higher signal quality.

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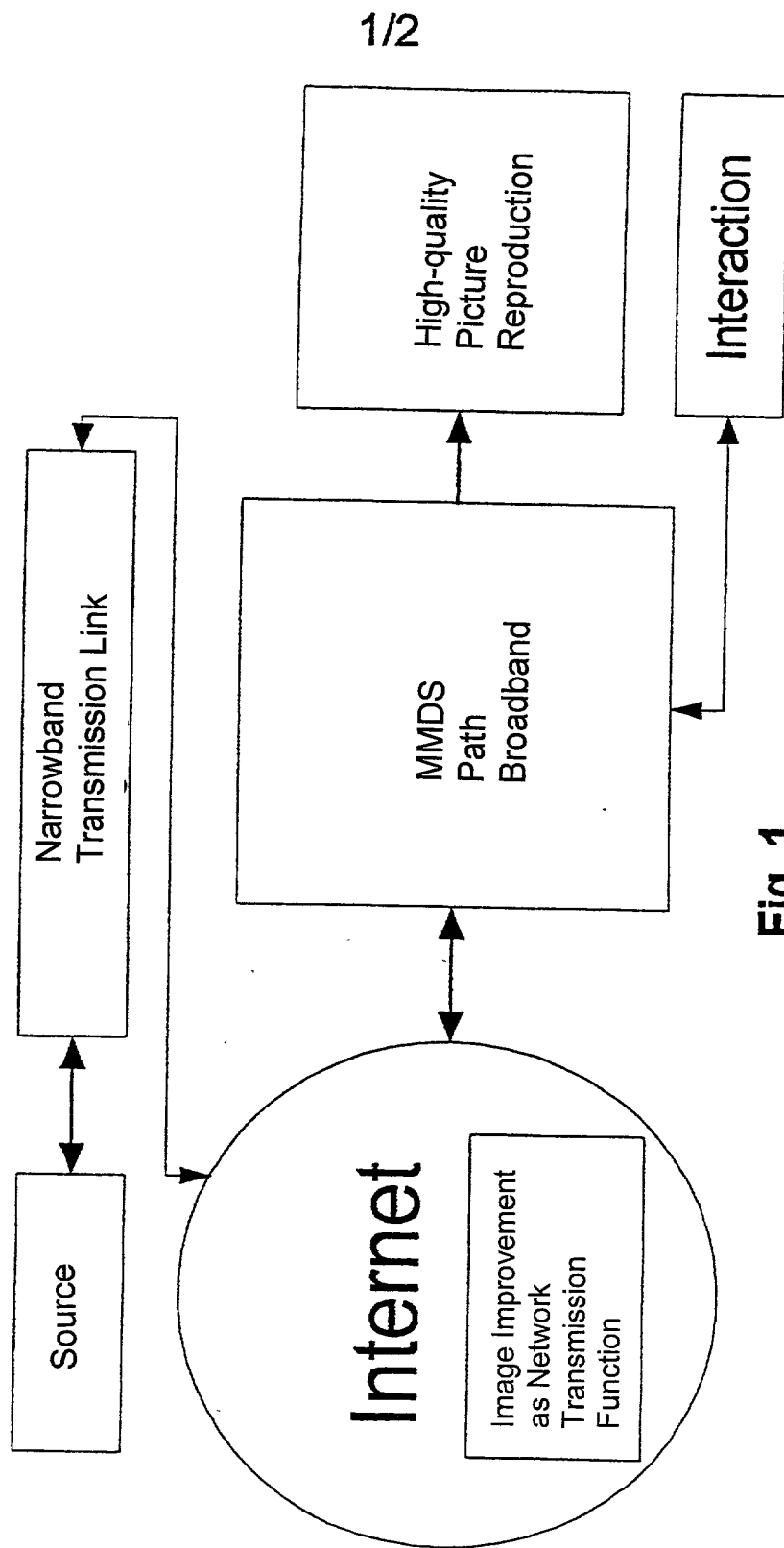


Fig. 1

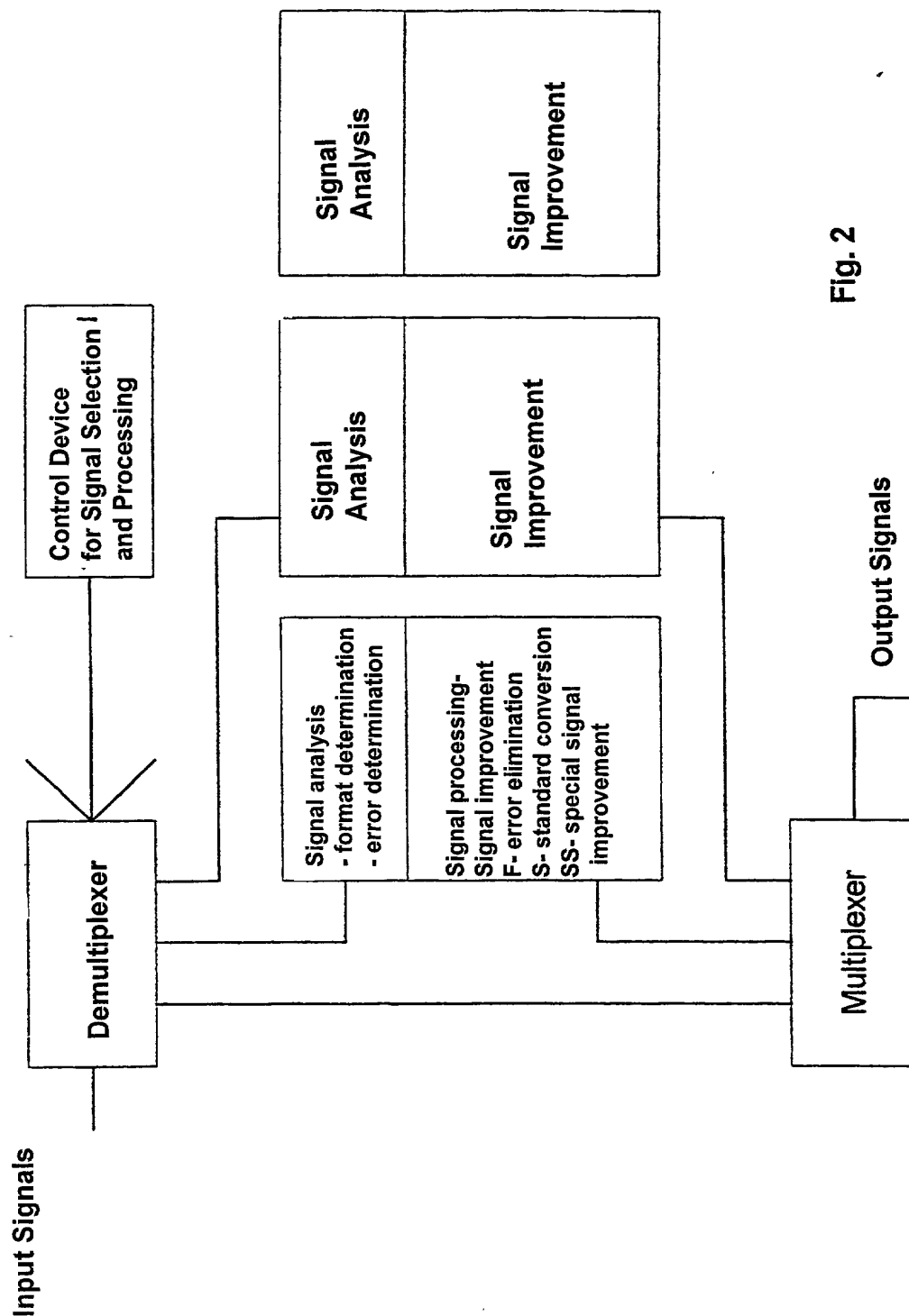


Fig. 2

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **TELECOMMUNICATIONS NETWORK STATION FOR TRANSMITTING DIGITALISED DATA**, the specification of which was filed as International Application No. PCT/EP00/01007 on January 26, 2000.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

PRIOR FOREIGN APPLICATION(S)

Number	Country Filed	Day/Month/Year	Priority Claimed Under 35 USC 119
199 10 144.2	Fed. Rep. of Germany	February 26, 1999	Yes

EL244504974

And I hereby appoint Richard L. Mayer (Reg. No. 22,490), Gerard A. Messina (Reg. No. 35,952) and Linda M. Shudy (Reg. No. 47,084) my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Please address all communications regarding this application to:

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One Broadway
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CUSTOMER NO. 26646

Please direct all telephone calls to Richard L. Mayer at (212) 425-7200.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful and false statements may jeopardize the validity of the application or any patent issued thereon.

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